# Cadiovascular System-1

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School of Medicine. Cardiovascular Physiology
***Medical Students***
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Textbook: Textbook of Medical Physiology
By: Arthur C. Guyton & John E. Hall 12th 2011 or 13th Edition 2016

| ***Lecture Topics*** | **Guyton 12th** | **Guyton 13th** |
|---|---|---|
| 1. Introduction | 57-69, 101-104 | 61-70,109-112 |
| 2. Cardiac mm. Physiology | 101-104 | 109-112 |
| 3. Conduction System of the heart | 115-120 | 123-129 |
| 4. Electrocardiography | 121-127 | 131-137 |
| 5. Electrocardiography | 129-136 | 139-148 |
| 6. Electrocardiography *(e-learning)* | 143-153 | 155-161 |
| 7. Electrocardiography *(e-learning)* | | |
| 8. Heart as a pump and cardiac cycle | 104-113 | 113-122 |
| 9. Heart as a pump and cardiac cycle *(e-learning)* | | |
| 10. Heart as a pump and cardiac cycle *(e-learning)* | | |
| 11. Cardiac output and venous return | 229-241 | 245-258 |
| 12. Cardiac output and venous return | | |
| 13. Circulation / systemic | 157-175 | 169-188 |
| 14. Circulation / systemic | 157-175 | 169-188 |
| 15. Circulation / Haemodynamics | | |
| 16. Arterial System/Regulation of arterial blood pressure | 201-211 | 215-225 |
| 17. Arterial System/ Regulationof ABP. *(e-learning)* | 213-228 | 227-243 |
| 18. Blood flow / Tissues and is control | 191-200 | 203-213 |
| 19. Special circulation(coronary Pulmonary, skeletal muscle) | 243-253 | 259-269 |

**Optional Readings:**

1. Physiology , latest edition , by : Berne and Levy last edition
2. Physiological Basis of Medical Practice, twelfth edition , by : John B. West 1990.
3. Human physiology from cells to systems, latest edition, by: Lauralee Sherwood. Last edition



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# Clinical Problem

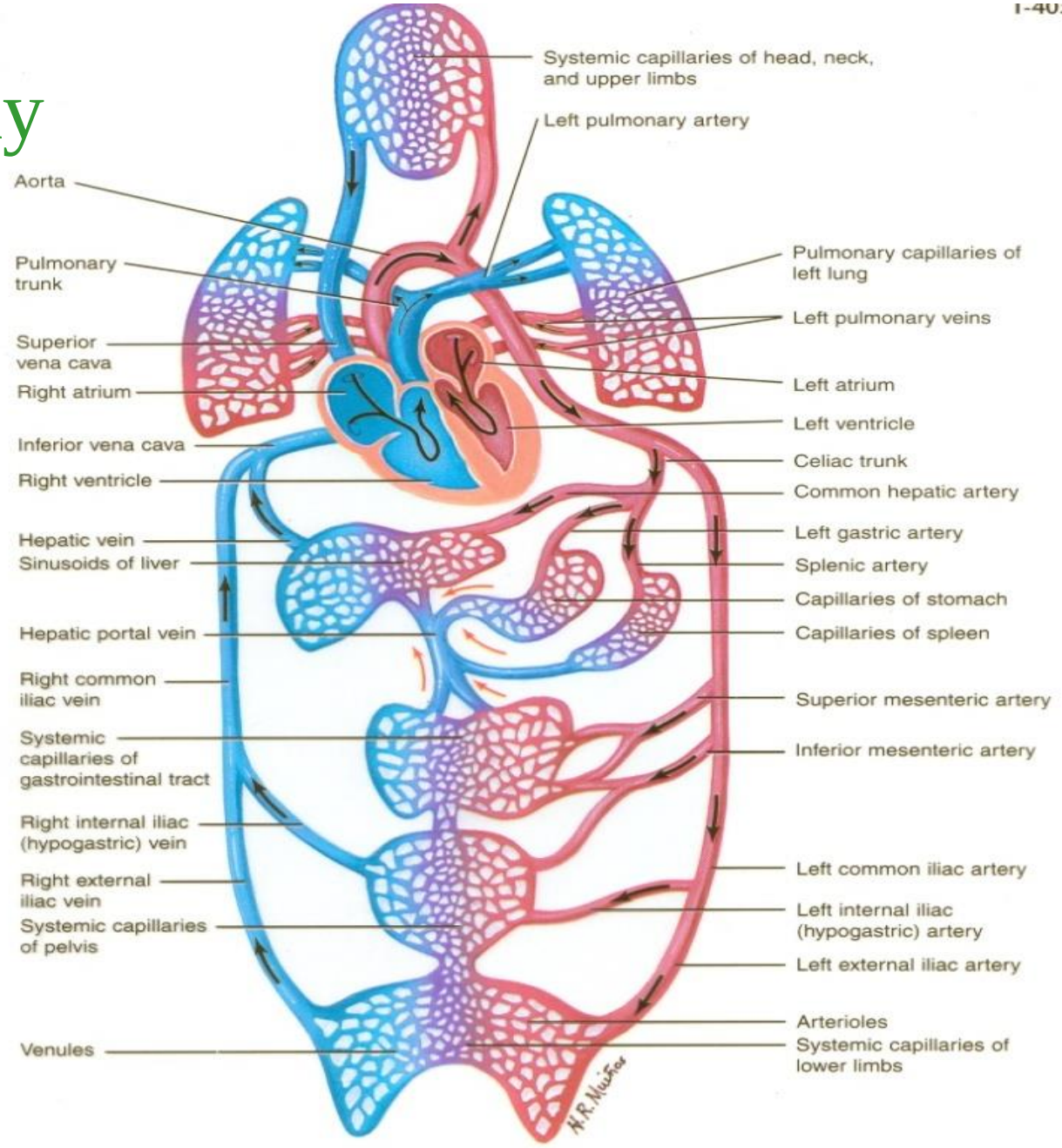
A 54 years old man seen in the cardiology clinic complaining of severe weakness, fatigue, dry cough, weight gain and difficulty in breathing. He feels severe shortness of breath while walking up stairs of his second floor apartment. He still complains of lesser severity of symptoms at rest. He states he often awakens at night feeling like he was suffocating. He is now sleeping with three pillows under his head. Lately he has taken to fall asleep while he is sitting watching T.V. He also complains of having to urinate 3-4 times per night. He was hospitalized with heart problem two months ago and was told that the efficiency of his heart is less than 30% and he needs ?? and has to wait until??. On examination his weight is 95Kg, height is 165 cm, blood pressure was 140/85 mmHg, his heart rate 90 beats/min and regular, his resp. rate is 28/min and labored.

Auscultation of the heart reveals abnormal heart sounds

# Objectives:

- Introduction to the CVS physiology
- Review the anatomy of the CVS.
- List the functions of the CVS
- Comprehend the pump nature of the heart

# Cardiovascular System Anatomy



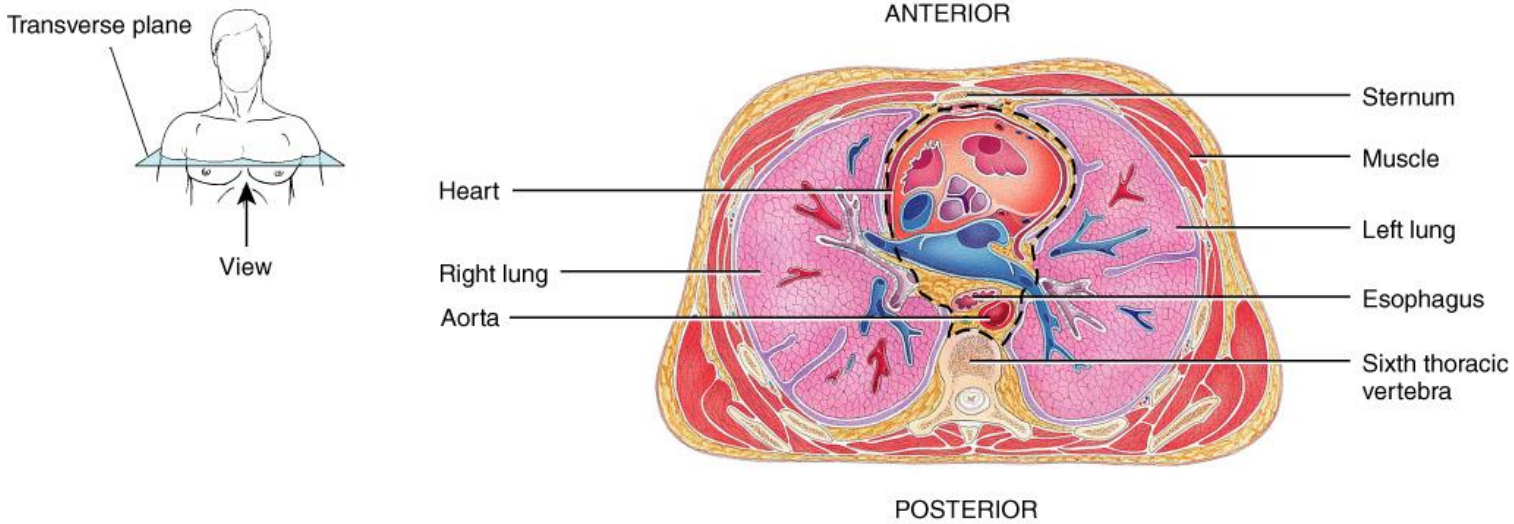

General plan of circulation

# History of cardiac Transplant

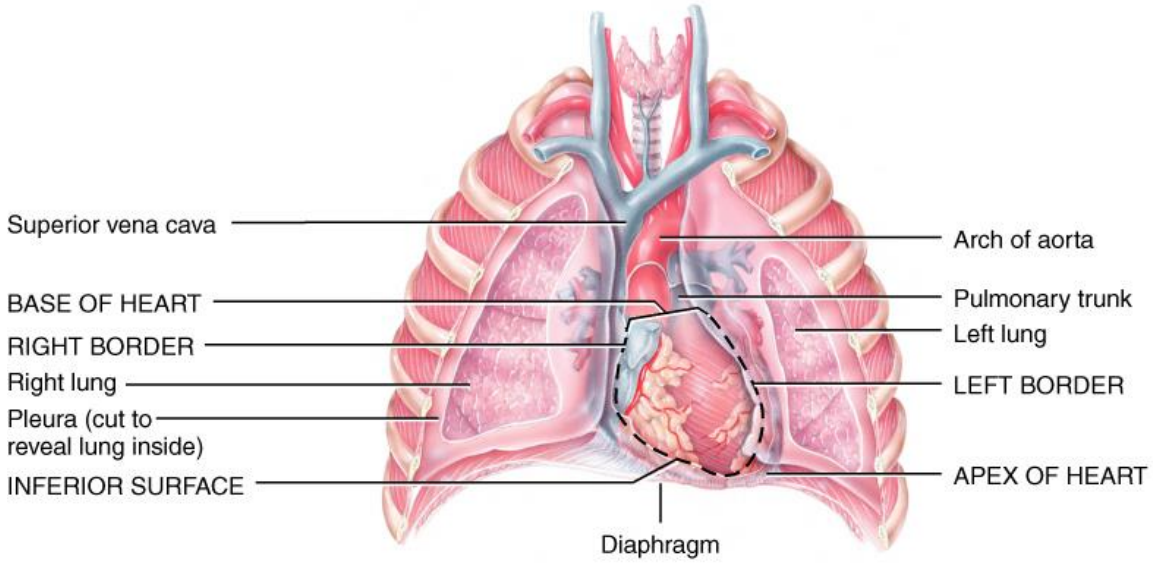
- **In 1967,** Christiaan Barnard in Cape Town, South Africa transplanted the first Human Heart removed from a 25-year-old woman who had died following an auto accident and placed it in the chest of Louis Washkansky, a 55-year-old man dying of heart damage. The patient survived for 18 days. The problem was Rejection- Cyclosporine – immunosuppressant -decreased that.
- **In 1984, the world's first successful pediatric heart transplant** was performed at Columbia on a four-year-old boy. He received a second transplant in 1989 and continues to live a productive life today.

# History of cardiac Transplant…cont

- **In 1984**, in Linda Loma, California, Leonard Bailey, implanted a baboon heart into a 12-day-old girl, she survived for twenty days.
- **In 1982** in University of Utah, the first Total Artificial Heart was implanted in the chest a dentist Barney Clark by William DeVries. Clark survived for 112 days-The problem was blood clotting.



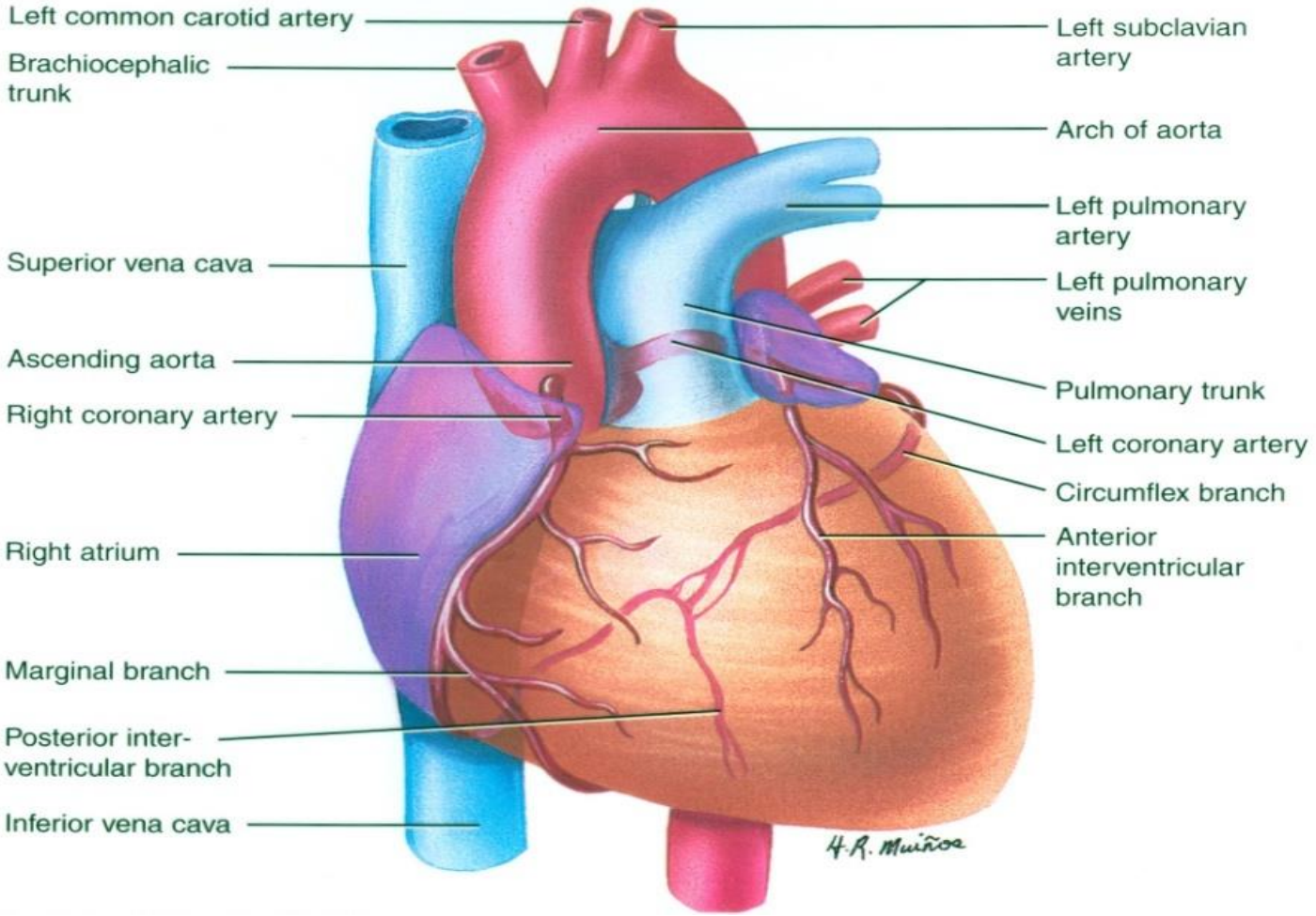

(a) Inferior view of transverse section of thoracic cavity showing the heart in the mediastinum



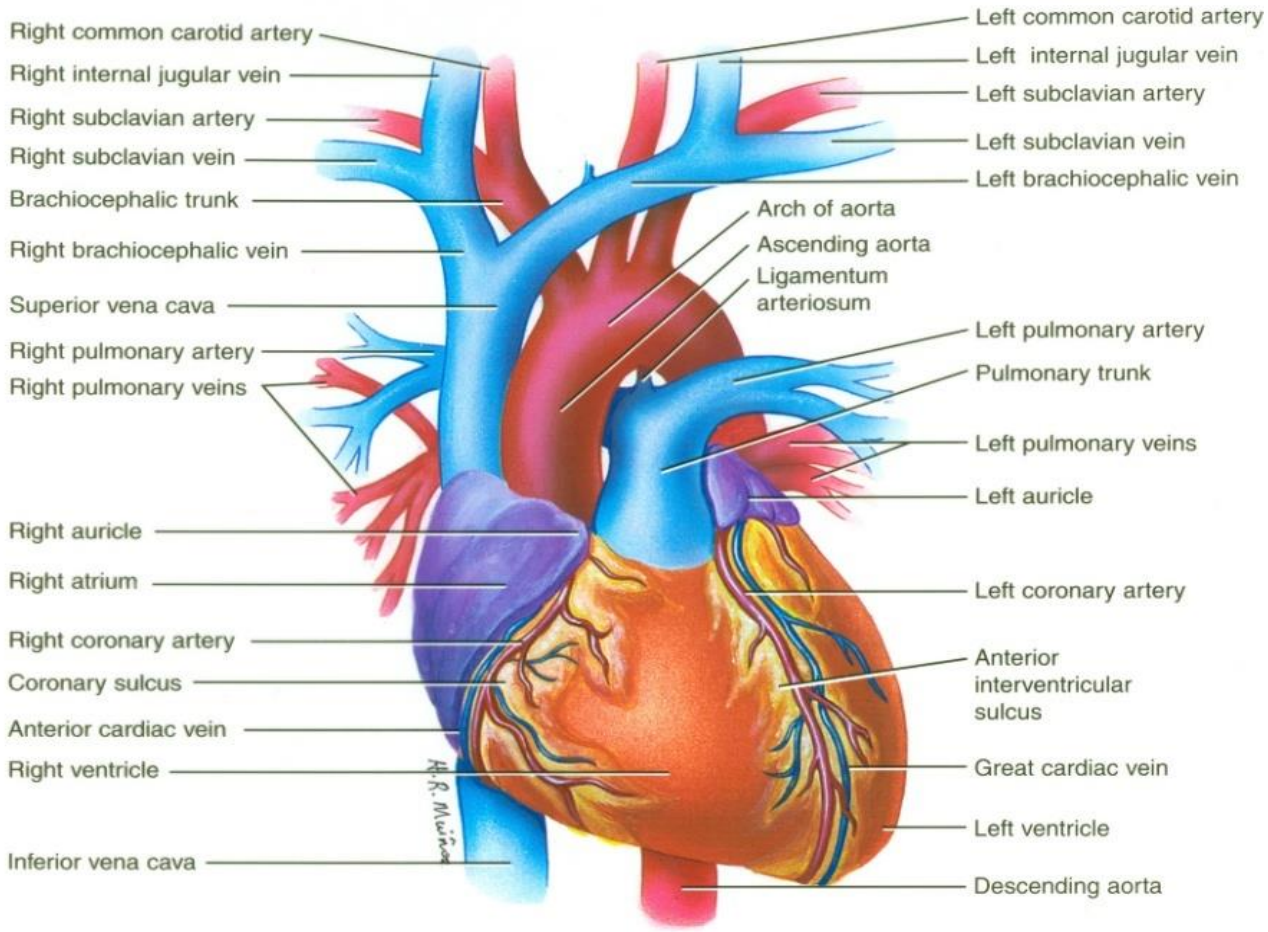

(b) Anterior view of the heart in the mediastinum

20.01

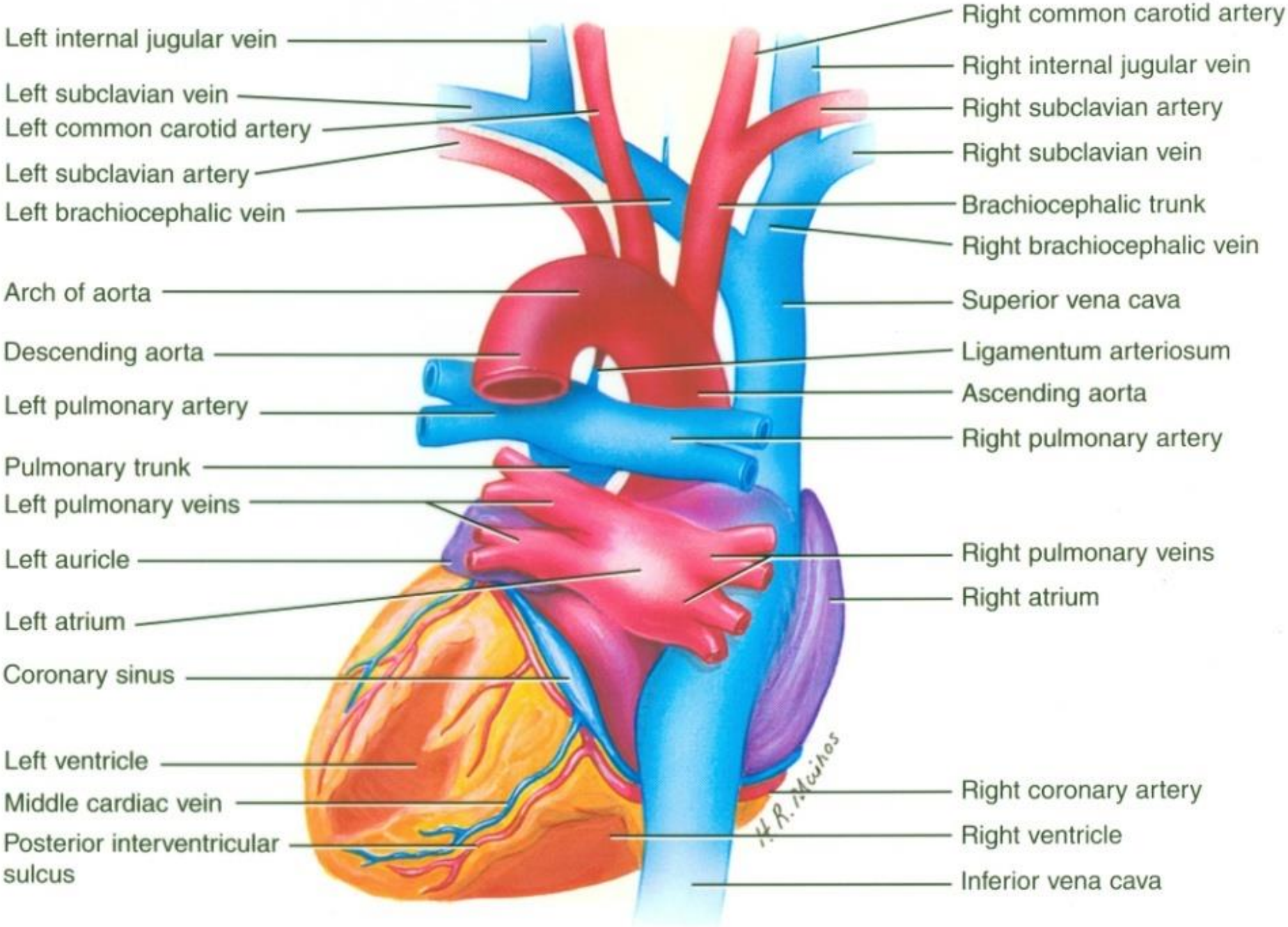
# Anatomy of the heart



# Anatomy of the heart

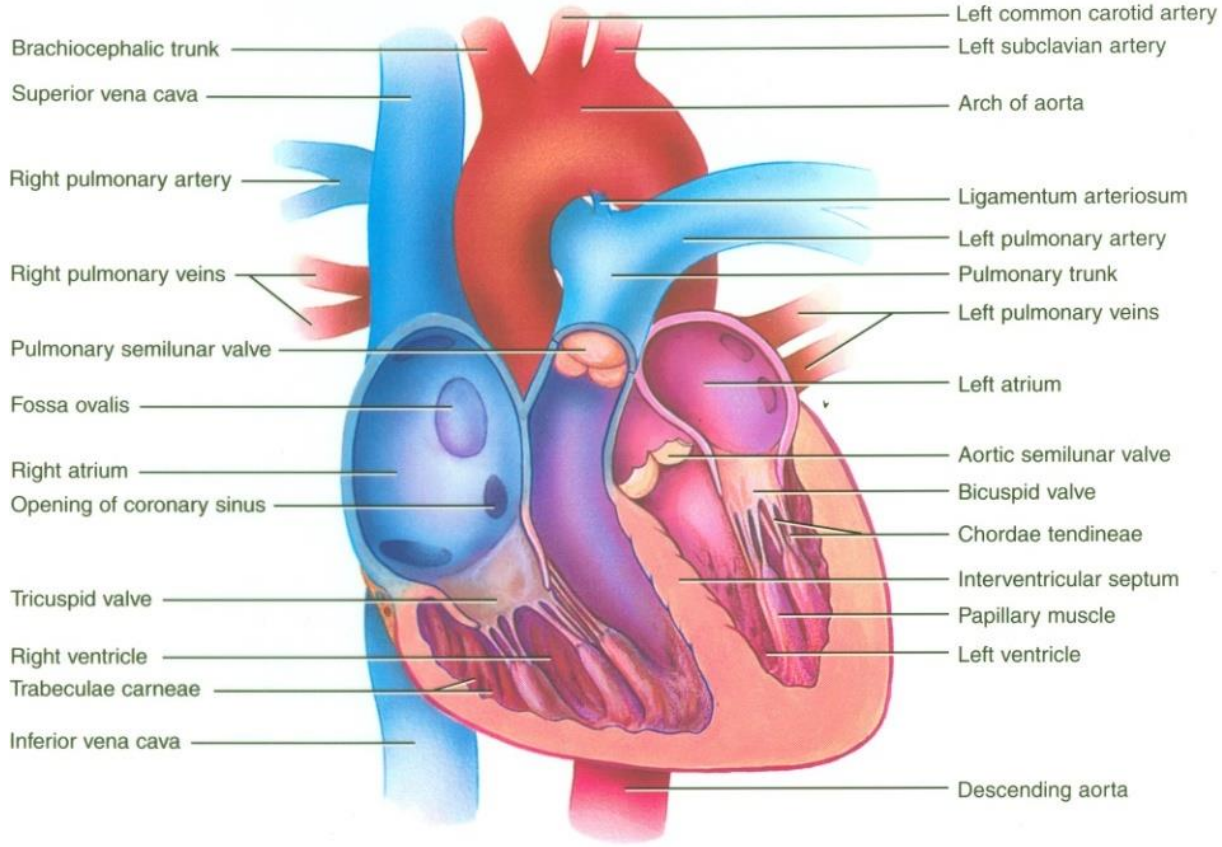



Anterior External View of Structure of Heart, Fig# 20.4a



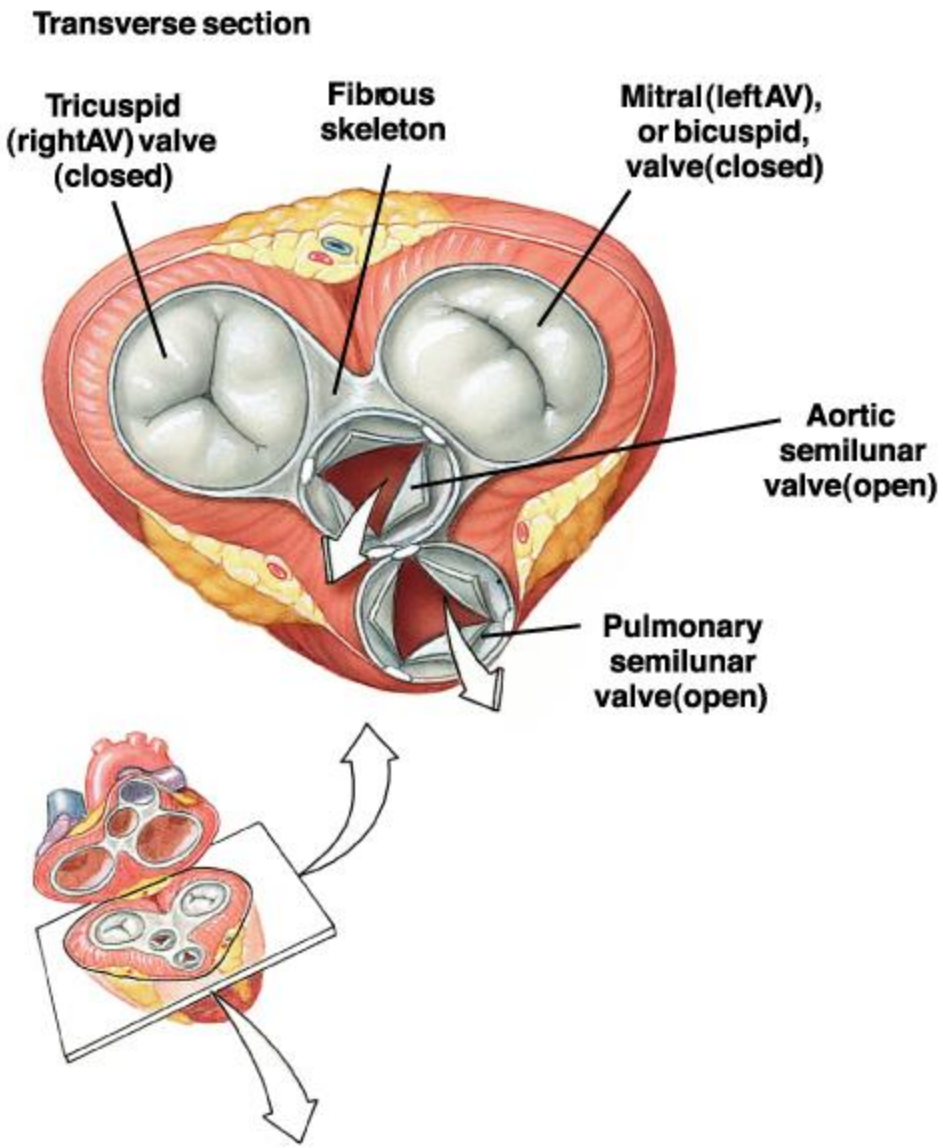

Posterior External View of Structure of Heart, Fig# 20.4c

# Cardiac valves

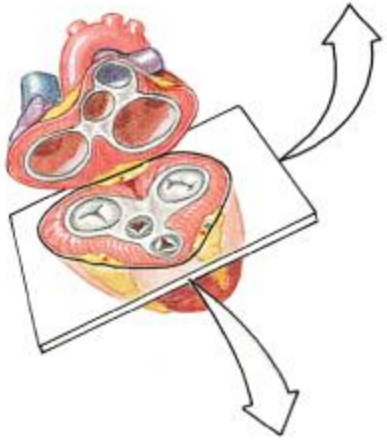


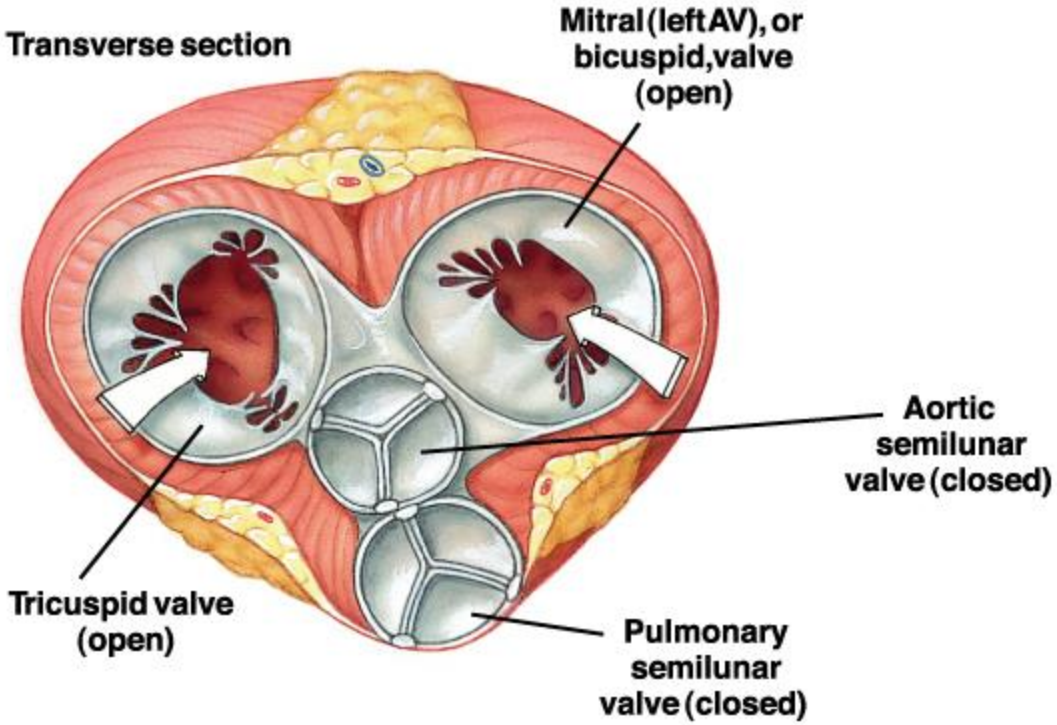

Anterior View of Frontal Section of Structure of Heart, Fig# 20.4d

# Cardiac valves

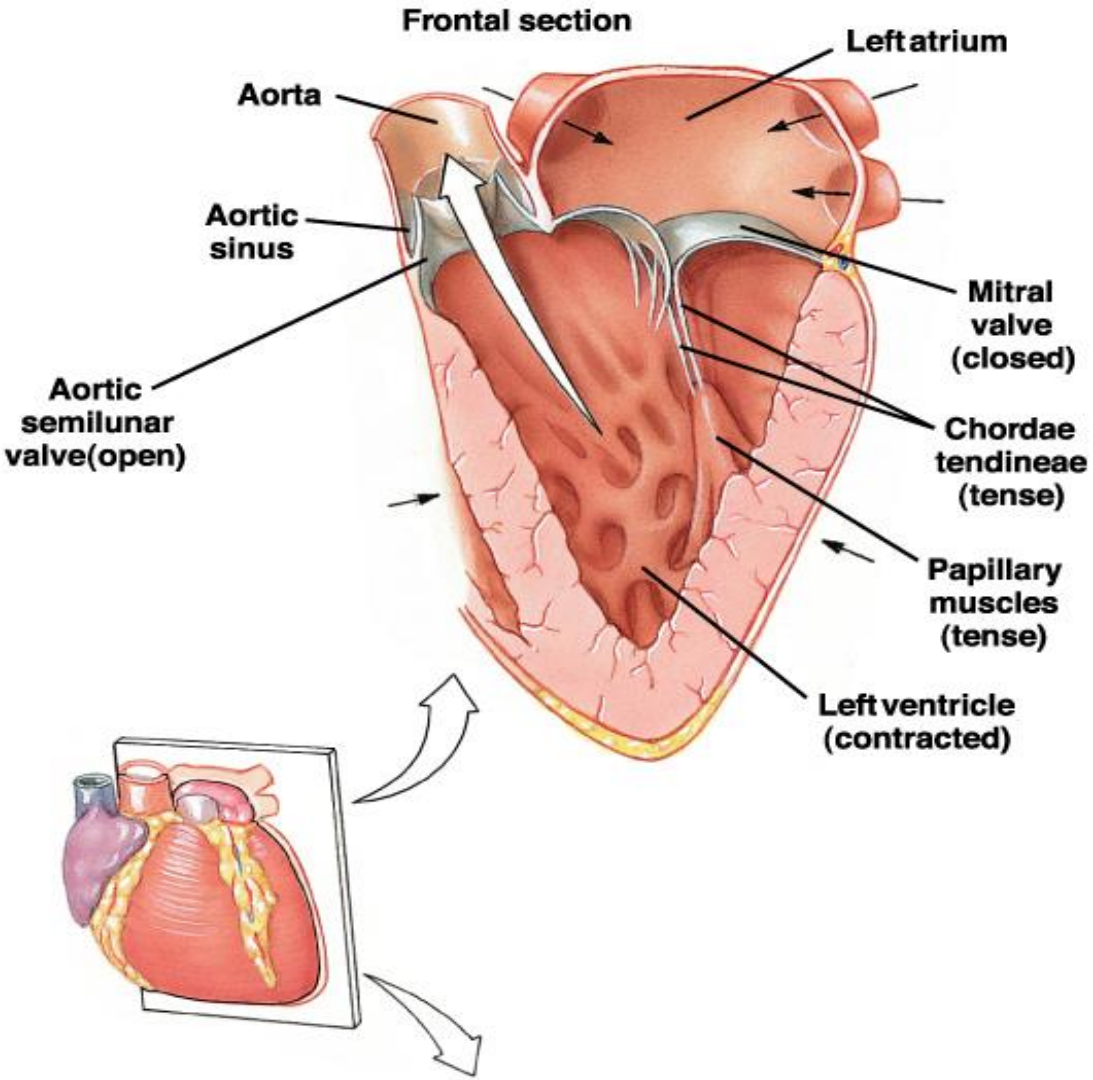


# Cardiac Valves Open and Close Passively





# Importance of Chordae Tendineae



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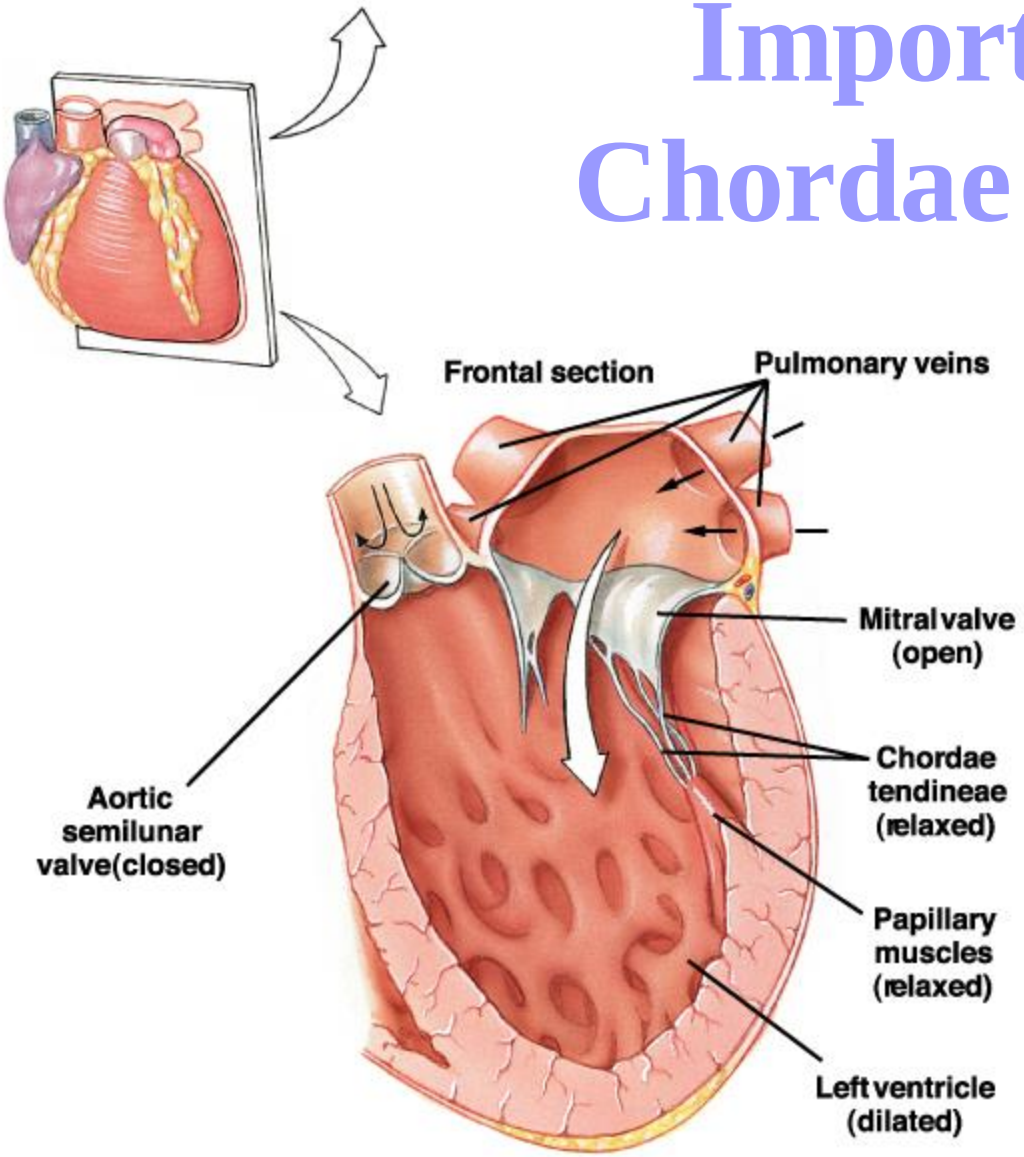
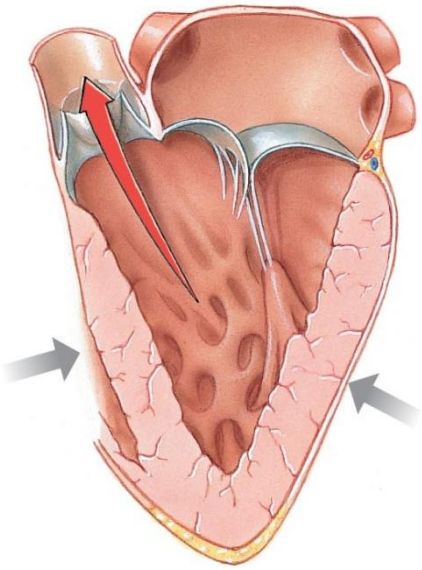
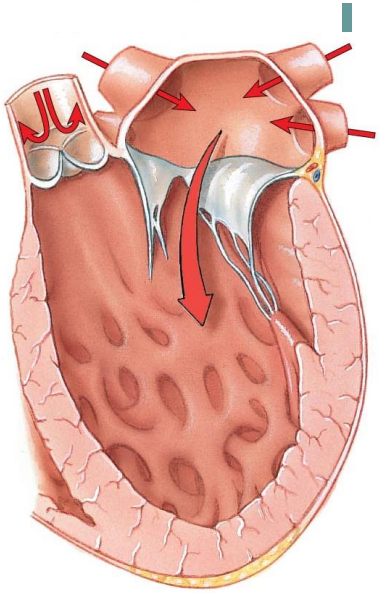


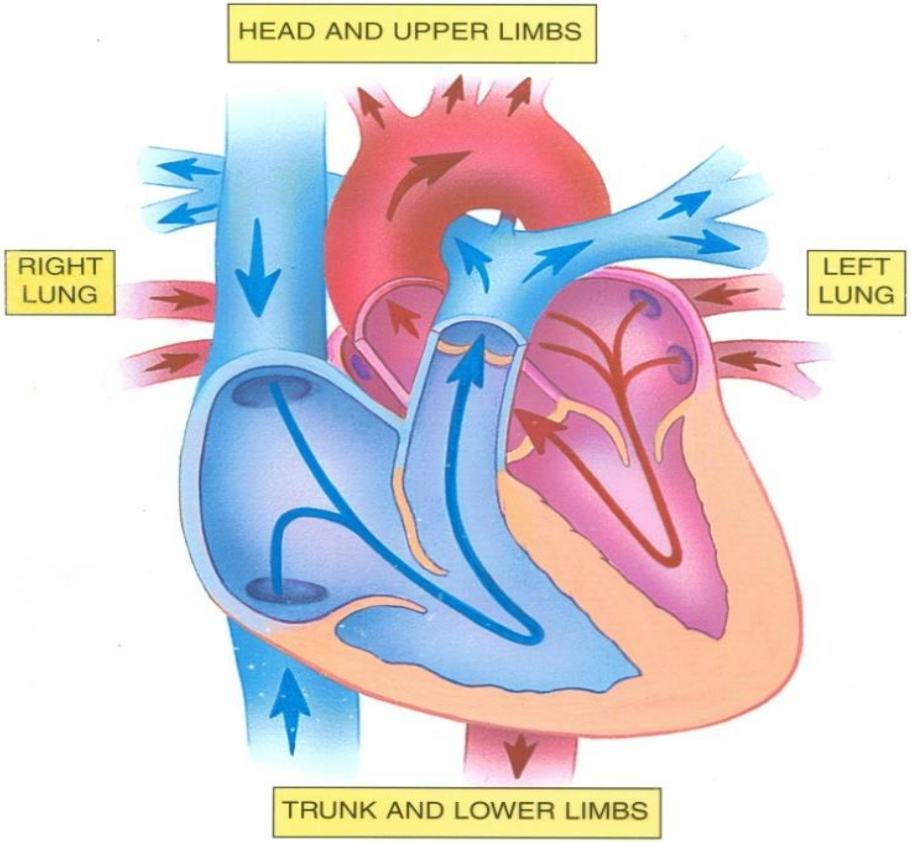
# Functional Anatomy of the Heart Valves

- Function is to prevent backflow
  - Atrioventricular Valves
    - Prevent backflow to the atria
    - Prolapse is prevented by the chordae tendinae
      - Tensioned by the papillary muscles
  - Semilunar Valves
    - Prevent backflow into ventricles





# Movement of blood in the heart




Blood Flow: Path of Blood Through Heart, Fig# 20.6a

# Thank You